Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method for embedding watermarking information, comprising:

providing a host signal;

calculating at least one feature of said host signal;

extracting said at least one feature from said host signal;

providing data to be embedded in the host signal;

associating distinct input data strings of said data with distinct code sets;

matching each of said at least one feature with a code from each code set;

selecting codes from the associated code sets to represent said input data strings based on said matching ~~an analysis of the host signal~~; and

embedding said selected codes into the host signal to provide a watermarked signal.

2. (Original) A method in accordance with claim 1, wherein said associating step is based on a predefined mapping.

3. (Original) A method in accordance with claim 2, wherein the predefined mapping is known to both a code selector at an encoder and a code interpreter at a decoder.

4. (Original) A method in accordance with claim 1, further comprising:

transmitting said watermarked signal to a decoder;

extracting said embedded codes from said watermarked signal; and

interpreting said codes to recover said data.

5. (Original) A method in accordance with claim 4, wherein said interpreting step comprises a many-to-one mapping of an extracted code to the associated data string.

6. (Original) A method in accordance with claim 1, further comprising:

error correction coding of said data.

7. (Original) A method in accordance with claim 1, further comprising:

segmenting the data into said input strings.

8. (Original) A method in accordance with claim 1, further comprising:

generating for each input data string a code set containing said codes.

9. (Original) A method in accordance with claim 8, wherein:

said code set contains L codes;

each code is m-bits long;

L is less than or equal to 2^{m-n};

n is any positive integer; and

m is greater than n.

10. (Currently amended) A method ~~in accordance with claim 1,~~ for embedding watermarking information, comprising:

providing a host signal;

providing data to be embedded in the host signal;

associating distinct input data strings of said data with distinct code sets;

selecting codes from the associated code sets to represent said input data strings based on an analysis of the host signal; and

embedding said codes into the host signal to provide a watermarked signal

wherein the codes within the code sets are selected such that they have a maximum

Hamming distance.

11. (Cancelled).

12. (Currently amended) A method in accordance with claim ~~11~~ 1, wherein said matching comprises:

calculating a cross-correlation factor between the extracted feature and each code from said code set; and

comparing each cross-correlation factor to determine the code which is a best match for said feature of said host signal.

13. (Previously presented) A method in accordance with claim 12, wherein:

said selecting step comprises selecting said code which is a best match for said feature; and

said embedding step comprises embedding said selected code in the host signal at a location of the feature used in said matching step.

14. (Original) A method in accordance with claim 13, further comprising:

assigning appropriate gains to said selected code in order to reduce distortion of the host signal when said selected code is embedded in said host signal.

15. (Original) A method in accordance with claim 1, wherein said input strings are mapped to codes with the objective of minimizing distortion of the host signal.

16. (Original) A method in accordance with claim 1, wherein said codes are symbol-error correcting codes, with each symbol corresponding to one data segment that is mapped to the host matching codes in order to limit error multiplication effects.

17. (Currently amended) A method for embedding watermarking information, comprising:

providing a host signal;

providing data to be embedded in the host signal;

error correction coding of said data;

scrambling said data with each code from a code set to provide a plurality of scrambled data sequences;

comparing each scrambled data sequence to said host signal;

selecting a scrambled sequence which is a best match to said host signal; ~~and~~

embedding said best matched scrambled data sequence into the host signal to provide a watermarked signal;

transmitting said watermarked signal to a decoder;

extracting said embedded scrambled data sequence from said watermarked signal;

further scrambling said extracted scrambled data sequence with each code from said code set to provide a plurality of unscrambled data sequences;

error-decoding of each of said unscrambled data sequences; and

determining which of said error-decoded unscrambled data sequences is a valid watermarking sequence.

18. (Original) A method in accordance with claim 17, wherein said scrambling step comprises an XOR operation between the data and each code of the code set.

19-22. (Cancelled).

23. (Currently amended) A method for recovering embedded watermarking data from a watermarked signal, comprising the steps of:

receiving said watermarked signal;

extracting embedded codes from said watermarked signal; and

interpreting said extracted codes to recover said watermarking data;

wherein:

each code represents an input string of said watermarking data, each code being selected from a code set associated with said input data string ~~based on an analysis of a host signal to be watermarked~~; and

said watermarked signal is generated by:

calculating at least one feature of said host signal;

extracting said at least one feature from said host signal; and

matching each of said at least one feature with a code from each code set.

24. (Original) A method in accordance with claim 23, wherein each code is associated with said input string based on a predefined mapping known to both a code selector at an encoder and a code interpreter at a decoder.

25. (Original) A method in accordance with claim 23, wherein said interpreting step comprises a many-to-one mapping of the extracted codes to said data string.

26. (Original) A method in accordance with claim 23, wherein:

said code set contains L codes;

each code is m-bits long;

L is less than or equal to 2^{m-n};

n is any positive integer; and

m is greater than n.

27. (Original) A method in accordance with claim 23, wherein the codes within the code sets are selected such that they have a maximum Hamming distance.

28. (Cancelled).

29. (Currently amended) A method in accordance with claim ~~28~~ 23, wherein said matching comprises:

calculating a cross-correlation factor between the extracted feature and each code from said code set; and

comparing each cross-correlation factor to determine the code which is a best match for said feature of said host signal.

30. (Previously presented) A method in accordance with claim 29, wherein:

a code which is a best match for said feature is selected from the code set; and

said selected code is embedded in the host signal at a location of the feature used in said matching step.

31. (Currently amended) A method ~~in accordance with claim 30, further comprising:~~ for recovering embedded watermarking data from a watermarked signal, comprising the steps of:

receiving said watermarked signal;

extracting embedded codes from said watermarked signal;

interpreting said extracted codes to recover said watermarking data;

wherein each code represents an input string of said watermarking data, each code being selected from a code set associated with said input data string based on an analysis of a host signal to be watermarked; and

assigning appropriate gains to said selected code in order to reduce distortion of the host signal when said selected code is embedded in said host signal.

32. (Original) A method in accordance with claim 23, wherein said codes are symbol-error correcting codes, with each symbol corresponding to one data segment that is mapped to the host matching codes in order to limit error multiplication effects.

33. (Previously presented) A method for recovering watermarking data from a watermarked

signal, comprising the steps of:

receiving said watermarked signal at a decoder;

extracting an embedded scrambled data sequence from said watermarked signal;

generating a plurality of scrambled data sequences at said decoder;

comparing said extracted scrambled data sequence with said plurality of scrambled data sequences generated at said decoder; and

determining whether any of said scrambled data sequences generated at said decoder match, within predefined parameters, said extracted data sequence;

wherein said embedded scrambled data sequence is selected from a plurality of scrambled data sequences generated by scrambling said watermarking data with each code from a code set, based on a comparison with a host signal.

34. (Original) A method in accordance with claim 33, wherein said scrambling of said watermarking data with said codes comprises an XOR operation between the watermarking data and each code.

35. (Original) A method in accordance with claim 33, wherein said generating of a plurality of scrambled data sequences at the decoder comprises scrambling said watermarking data with each code from a code set to provide a plurality of scrambled data sequences at said decoder.

36. (Previously presented) A method for recovery of watermarking information from a watermarked signal, comprising the steps of:

receiving said watermarked signal;

extracting an embedded scrambled data sequence from said watermarked signal;

further scrambling said extracted scrambled data sequence with codes from a code set to provide a plurality of unscrambled data sequences;

error-decoding each of said unscrambled data sequences; and

determining which of said error-decoded unscrambled data sequences is a valid

watermarking sequence;

wherein said embedded scrambled data sequence is selected from a plurality of scrambled data sequences generated by scrambling error-encoded watermarking data with each code from a code set, based on a comparison with a host signal.

37. (Currently amended) Apparatus for embedding watermarking information, comprising:

a feature extractor for calculating and extracting at least one feature of said host signal;

a code selector for ~~providing codes~~ associating distinct code sets with distinct input data strings to be embedded in a host signal; ~~and~~

a matching device for matching each of said at least one feature with a code from each of said code sets;

said code selector selecting codes from the associated code sets to represent said input data strings based on said matching; and

an embedder for embedding said selected codes into the host signal to provide a watermarked signal~~;~~

~~wherein said code selector:~~

~~associates distinct input data strings to be embedded into said host signal with distinct code sets; and~~

~~selects codes from the associated code sets to represent said input data strings based on an analysis of the host signal~~.

38. (Original) Apparatus in accordance with claim 37, wherein said code selector associates said distinct input data strings with distinct code sets based on a predefined mapping.

39. (Original) Apparatus in accordance with claim 38, wherein the predefined mapping is known to both the code selector at an encoder and a code interpreter at a decoder.

40. (Original) Apparatus in accordance with claim 37, further comprising:

a transmitter for transmitting said watermarked signal to a decoder;

an extractor for extracting said embedded codes from said watermarked signal; and

a code interpreter for interpreting said codes to recover data represented thereby.

41. (Original) Apparatus in accordance with claim 40, wherein said interpreting comprises a many-to-one mapping of an extracted code to the associated data string.

42. (Original) Apparatus in accordance with claim 37, further comprising:

a channel encoder for error correction coding of said data.

43. (Original) Apparatus in accordance with claim 37, further comprising:

a data segmentation device for segmenting the data into said input strings.

44. (Original) Apparatus in accordance with claim 37, further comprising:

a code list generator for generating for each input data string a code set containing said codes.

45. (Original) Apparatus in accordance with claim 44, wherein:

said code set contains L codes;

each code is m-bits long;

L is less than or equal to 2^{m-n};

n is any positive integer; and

m is greater than n.

46. (Currently amended) Apparatus ~~in accordance with claim 37, wherein~~ for embedding watermarking information, comprising:

a code selector for providing codes to be embedded in a host signal; and

an embedder for embedding said codes into the host signal to provide a watermarked

signal;

wherein:

said code selector:

associates distinct input data strings to be embedded into said host signal with distinct code sets; and

selects codes from the associated code sets to represent said input data strings based on an analysis of the host signal; and

the codes within the code sets are selected such that they have a maximum Hamming distance.

47. (Cancelled).

48. (Currently amended) Apparatus in accordance with claim ~~47~~ 37, wherein:

said matching device calculates a cross-correlation factor between the extracted feature and each code from said code set and compares each cross-correlation factor to determine the code which is a best match for said feature of said host signal.

49. (Previously presented) Apparatus in accordance with claim 48, wherein:

said code is selected which is a best match for said feature; and

said selected code is embedded in the host signal at a location of the feature used in said matching.

50. (Original) Apparatus in accordance with claim 49, wherein:

appropriate gains are assigned to said selected code in order to reduce distortion of the host signal when said selected code is embedded in said host signal.

51. (Original) Apparatus in accordance with claim 37, wherein said input strings are mapped to codes with the objective of minimizing distortion of the host signal.

52. (Original) Apparatus in accordance with claim 37, wherein said codes are symbol-error correcting codes, with each symbol corresponding to one data segment that is mapped to the host matching codes in order to limit error multiplication effects.

53. (Currently amended) Apparatus for embedding watermarking information, comprising:

a channel encoder for error correction coding of data to be embedded in a host signal;

a first scrambler for scrambling said data ~~to be embedded in a host signal~~ with each code from a code set to provide a plurality of scrambled data sequences;

a code selector for comparing each scrambled data sequence to said host signal and selecting a scrambled sequence which is a best match to said host signal; ~~and~~

an embedder for embedding said best matched scrambled data sequence into the host signal to provide a watermarked signal;

a transmitter for transmitting said watermarked signal to a decoder;

an extractor for extracting said embedded scrambled data sequence from said watermarked signal;

a second scrambler for further scrambling said extracted scrambled data sequence with each code from said code set to provide a plurality of unscrambled data sequences; and

a channel decoder for error-decoding of each of said unscrambled data sequences and determining which of said error-decoded unscrambled data sequences is a valid watermarking sequence.

54. (Original) Apparatus in accordance with claim 53, wherein said scrambler performs an XOR operation between the data and each code of the code set.

55-58. (Cancelled).

59. (Currently amended) Apparatus for recovering embedded watermarking data from a

watermarked signal, comprising:

an extractor for extracting embedded codes from a received watermarked signal; and

an interpreter for interpreting said extracted codes to recover said watermarking data;

wherein:

each code represents an input string of said watermarking data, each code being selected from a code set associated with said input data string ~~based on an analysis of a host signal to be watermarked~~; and

said watermarked signal is generated at an encoder by:

calculating at least one feature of said host signal;

extracting said at least one feature from said host signal; and

matching each of said at least one feature with a code from each code set.

60. (Original) Apparatus in accordance with claim 59, wherein each code is associated with said input string based on a predefined mapping known to both a code selector at an encoder and a code interpreter at a decoder.

61. (Original) Apparatus in accordance with claim 59, wherein said interpreter provides a many-to-one mapping of the extracted codes to said data string.

62. (Original) Apparatus in accordance with claim 59, wherein:

said code set contains L codes;

each code is m-bits long;

L is less than or equal to 2^{m-n};

n is any positive integer; and

m is greater than n.

63. (Original) Apparatus in accordance with claim 59, wherein the codes within the code sets are selected such that they have a maximum Hamming distance.

64. (Cancelled).

65. (Currently amended) Apparatus in accordance with claim ~~64~~ 59, wherein said matching comprises:

calculating a cross-correlation factor between the extracted feature and each code from said code set; and

comparing each cross-correlation factor to determine the code which is a best match for said feature of said host signal.

66. (Previously presented) Apparatus in accordance with claim 65, wherein:

a code selector at said encoder selects a code from the code set which is a best match for said feature; and

an embedder at said encoder embeds said selected code in the host signal at a location of the feature used in said matching step.

67. (Currently amended) Apparatus ~~in accordance with claim 66, wherein:~~ for recovering embedded watermarking data from a watermarked signal, comprising:

an extractor for extracting embedded codes from a received watermarked signal; and

an interpreter for interpreting said extracted codes to recover said watermarking data;

wherein each code represents an input string of said watermarking data, each code being selected from a code set associated with said input data string based on an analysis of a host signal to be watermarked;

wherein appropriate gains are assigned to said selected code in order to reduce distortion of the host signal when said selected code is embedded in said host signal.

68. (Original) Apparatus in accordance with claim 59, wherein said codes are symbol-error correcting codes, with each symbol corresponding to one data segment that is mapped to the host

matching codes in order to limit error multiplication effects.

69. (Previously presented) Apparatus for recovering watermarking data from a watermarked signal, comprising:

an extractor for extracting an embedded scrambled data sequence from a received watermarked signal;

a scrambler for generating a plurality of scrambled data sequences; and

a processor for comparing said extracted scrambled data sequence with said plurality of scrambled data sequences generated at said decoder, said processor determining whether any of said scrambled data sequences generated at said decoder match, within predefined parameters, said extracted data sequence;

wherein said embedded scrambled data sequence is selected from a plurality of scrambled data sequences generated by scrambling said watermarking data with each code from a code set, based on a comparison with a host signal

70. (Original) Apparatus in accordance with claim 69, wherein said scrambler performs an XOR operation between the watermarking data and each code.

71. (Original) Apparatus in accordance with claim 69, wherein said scrambler generates a plurality of scrambled data sequences at the decoder by scrambling said watermarking data with each code from a code set to provide a plurality of scrambled data sequences at said decoder.

72. (Previously presented) Apparatus for recovery of watermarking information from a watermarked signal, comprising:

an extractor for extracting an embedded scrambled data sequence from a received watermarked signal;

a scrambler for further scrambling said extracted scrambled data sequence with codes from a code set to provide a plurality of unscrambled data sequences; and

a channel decoder for error-decoding each of said unscrambled data sequences and determining which of said error-decoded unscrambled data sequences is a valid watermarking sequence;

wherein said embedded scrambled data sequence is selected from a plurality of scrambled data sequences generated by scrambling error-encoded watermarking data with each code from a code set, based on a comparison with a host signal.